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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,373	10/20/2008	Mark Edward Brennan Smith	2713-1-045PCT/US	2995

23565 7590 07/20/2011

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EXAMINER	
GARYU, LIANKO G	

ART UNIT	PAPER NUMBER
1636	

MAIL DATE	DELIVERY MODE
07/20/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/585,373	SMITH ET AL.
	Examiner	Art Unit
	LIANKO GARYU	1636

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2011*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-53* is/are pending in the application.

4a) Of the above claim(s) *17-36 and 51-53* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16 and 37-50* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/21/2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/14/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The Art Unit for the present application has changed. However, the Technology Center (TC1600) and examiner of record remain the same.

Election/Restrictions

Applicant's election without traverse of Group I (Claims 1-16 and 37-50) in the reply filed on April 28, 2011 is acknowledged.

Claims 17-36 and 51-53 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group, there being no allowable generic or linking claim.

Drawings

The drawings are objected to because Figure 12, part c is labeled "FUG 12 c". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be

labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: There is no description for Figure 12c. Appropriate correction is required.

Claim Objections

Claim 4 is objected to because of the following informalities: there is a typo, "silica fused silica" in claim 4. The examiner interprets "silica fused silica" as "fused silica". It is suggested by the examiner to delete "silica" before the word "fused". Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16, 43, and 44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 43 are indefinite because it is unclear if the identifier "C" refers to the chemical compound carbon or to the limitation as stated in the instant claim as "a group for reaction with a compound to bind said compound covalently to said hydrogel". Claims 2-16 and 44 are indefinite because of the dependency from claims 1 or 43.

Claim 4 contains the trademark/trade name SPECTRASIL™. Where a trademark or trade name is used in a claim as a limitation to identify or describe a particular material or product, the claim does not comply with the requirements of 35 U.S.C. 112, second paragraph. See *Ex parte Simpson*, 218 USPQ 1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name cannot be used properly to identify any particular material or product. A trademark or trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade name is used to identify/describe fused silica and, accordingly, the identification/description is indefinite.

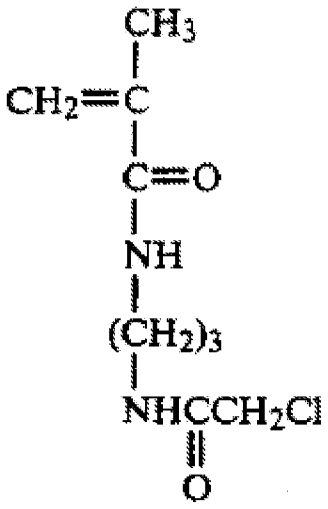
Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

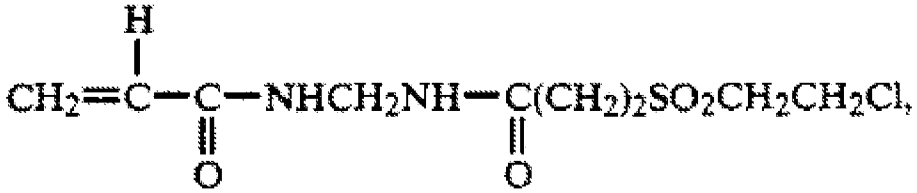
Claims 1, 2, 6-9, 11-13, and 14-16are rejected under 35 U.S.C. 102(b) as being anticipated by Ponticello et al. (US 5,212,253; May 1993).

Regarding claim 1, Ponticello et al. disclose a method of polymerizing Poly[acrylamide-co-N-(3-chloroacteamidopopyl)methacrylamide] copolymer mixture between two glass plates (support; not covalently modified). The mixture comprises acrylamide (first comonomer) and N-(3-chloroacetamidopropyl)-methacrylamide (second comonomer) wherein N-(3-chloroacetamidopropyl)-methacrylamide is a functionalized acrylamide of the Formula II as disclosed in the instant claim1.



wherein A is NH; B is $(CH_2)_3$ and C is a group for reaction NHC(=O)-CH_2-Cl (chloroacetamido) (Refer to the Specification Col. 11, lines 10-68; Col. 12, lines 1-19).

Furthermore, Ponticello et al. disclose co-polymerizing acrylamide with an acrylamide derivative such as N-[3-(2-chloroethylsulfonyl) propionamidomethyl] acrylamide (Formula I as disclosed in the instant claim1)

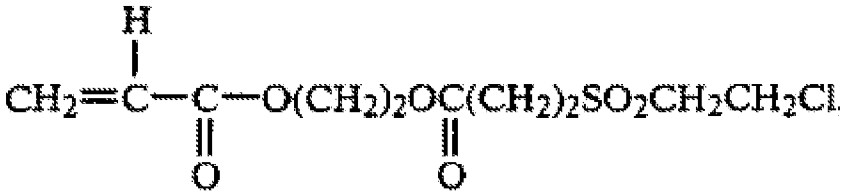


wherein A is NH, B is CH_2 and C is a group for reaction $CH_2NHC(=O)$-$(CH_2)_2SO_2CH_2CH_2Cl$

or N-[2-(ethoxycarbonylmethoxycarbonyl)ethyl]acrylamide (Formula I as disclosed in the instant claim1)

wherein A is NH, B is $(CH_2)_2$ and C is a group for reaction $COOCH_2COOC_2H_5$

or with an acrylate derivative such as 2-[3-(2-chloroethylsulfonyl)propionyloxy]ethyl acrylate (Formula I),

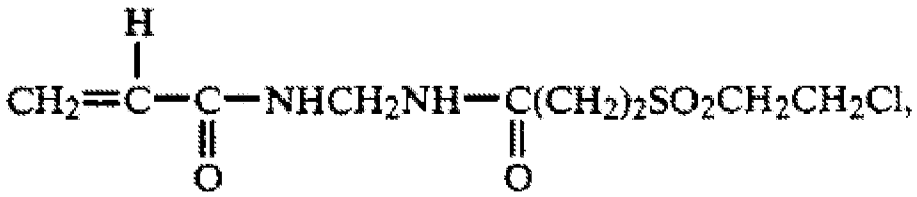


wherein A is O, B is $(CH_2)_2$ and C is a group for reaction $OC(=O)$-$(CH_2)_2SO_2CH_2CH_2Cl$ (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67)

Regarding claim 2, Ponticello et al. teach polymerizing a polymer solution between two glass (silica-based support) plates (Refer to the Specification Col. 9, lines 41-50; Col. 12, lines 12-15).

Regarding claim 6, Ponticello et al. disclose the comonomer is acrylamide (first comonomer (Refer to the Specification Col. 8 lines 42-67; Col. 11, lines 10-54).

Regarding claims 7-9, Ponticello et al. disclose co-polymerizing acrylamide with an acrylamide derivative such as N-[3-(2-chloroethylsulfonyl)propionamidomethyl]acrylamide (Formula I)

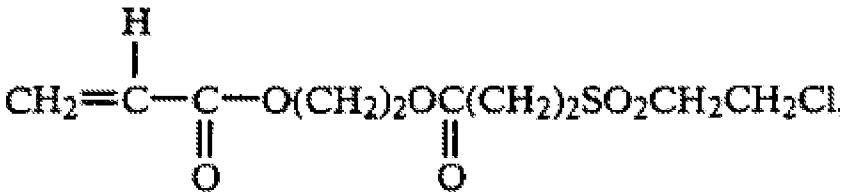


wherein A is NH, B is CH_2 and C is a group for reaction $CH_2NHC(=O)\text{-}(CH_2)_2SO_2CH_2CH_2Cl$

or N-[2-(ethoxycarbonylmethoxycarbonyl)ethyl]acrylamide (Formula I as disclosed in the instant claim1)

wherein A is NH, B is $(CH_2)_2$ and C is a group for reaction $COOCH_2COOC_2H_5$

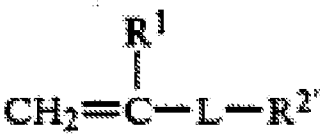
or with an acrylate derivative such as 2-[3-(2-chloroethylsulfonyl)propionyloxy]ethyl acrylate (Formula I as disclosed in the instant claim1),



wherein A is O, B is $(CH_2)_2$ and C is a group for reaction $OC(=O)$-$(CH_2)_2SO_2CH_2CH_2Cl$. Furthermore, Ponticello disclose an acrylamide of formula (I) wherein A=NH and an acrylamide wherein B is C_2-C_{10} alkylene biradical ($(CH_2)_2$, $(CH_2)_3$) (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67; Col. 11, lines 10-54).

Regarding claims 11 and 12, Ponticello et al. disclose C is a haloacetamido (bromoacetamido) (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67; Col. 11, lines 10-54; Claim 1).

Regarding claim 13, Ponticello et al. disclose an acrylamide derivative with the following formula



wherein R^1 is a hydrogen or methyl, $R^{2'}$ is a haloacetamido, and L is an $-(R_3)_k-(COXR_4)_m-(NHCO)n-$ group where R_3 is arylene, R_4 is alkylene of 1 to 6 carbon atoms, X is –O- or -NH-; and k, m, and n are each 0 or 1 provided that k is 0 when m is 1 and m is 0 when k is 1. Thus the

acrylamide formula with the functional group options disclosed by Ponticello et al. read on N-(5-bromoacetamidylpentyl) acrylamide wherein R^1 is a hydrogen, L is of the formula $-(R_3)_0-(COXR_4)_1-(NHCO)_1-$ group where k is 0 , m=n is 1, X is NH, R_4 is an alkylene of 5 carbon atoms which read on $(CH_2)_5$, and $R^{2'}$ is a haloacetamido which reads on bromoacetamido.

Regarding claims 14 and 15, Ponticello et al. disclose the mole ratio of acrylamide (first comonomer) /(3-chloroacetamidopropyl)-methacrylamide (second comonomer) is 96.5/3.5 (i.e. (3-chloroacetamidopropyl)-methacrylamide is present in the amount of 3.5% relative to the total molar quantity of total comonomers) which reads on the limitations, in instant claims 14 and 15, of ≥ 1 % and ≥ 2% relative to the total molar quantity of total comonomers (Refer to the Specification, Col. 13, lines 35-46).

Regarding claim 16, Ponticello disclose the method of polymerizing acrylamide N-(3-chloroacetamidopropyl)methacrylamide with no crosslinking agent or with dithiothreitol (polyunsaturated crosslinker) (Refer to the Specification, Col. 11, lines 10-30 and Col. 12, lines 1-7).

Claims 37, 38, 39, 45, and 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al. (US 2003/0008413 A1; published January 2003).

Regarding claims 37 and 48, Kim et al. teach a method comprising the step of applying polyelectrolyte films and coatings (polyelectrolyte) to a substrate surface comprising attached biomolecules (immobilized biomolecules) for the production of high performance microarrays of

biomolecules (molecular array comprising a plurality of molecules) (Refer to the Specification [0045 and 0080]).

Regarding claim 38, Kim et al. disclose the molecules of interest are biomolecules (e.g. peptide, amino acid, proteins, and nucleic acids) (Refer to the Specification [0001-0003, 0020-0029, 0045, 0052, 0072, 0075, 0079, 0080, and 0100]).

Regarding claim 39, Kim et al. disclose microarrays on glass substrates (support; silica-based substrate) and polymethyl methacrylate (hydrogel) (Refer to the Specification [0002, 0003, 0010, 0011, 0056, and 0066]).

Regarding claim 45, Kim et al. disclose the polyelectrolyte applied is polyacrylic acid (Refer to the Specification ([0016]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

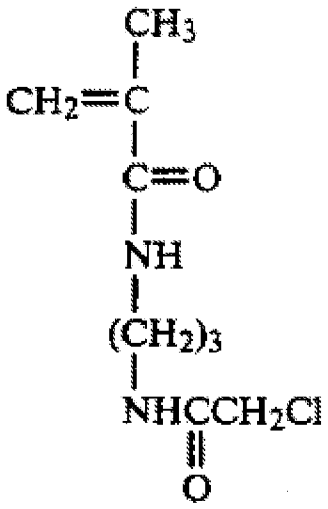
The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ponticello et al. (US 5,212,253; May 1993) in view of Leon et al. (US 2005/0064431 A1; filed September 2003), and Patani et al. ("Bioisoterism: A Rational Approach in Drug Design, 1996", Chemical Reviews, 96, 3147-3176).

Regarding claim 1, Ponticello et al. teach a method of polymerizing Poly[acrylamide-co-N-(3-chloroacteamidopopyl)methacrylamide] copolymer mixture between two glass plates (support; not covalently modified). The mixture comprises acrylamide (first comonomer) and N-(3-chloroacetamidopropyl)-methacrylamide (second comonomer) wherein N-(3-chloroacetamidopropyl)-methacrylamide is a functionalized acrylamide of the Formula II as disclosed in the instant claim1.



wherein A is NH; B is $(CH_2)_3$ and C is a group for reaction NHC(=O)-CH_2-Cl (chloroacetamido) (Refer to the Specification Col. 11, lines 10-68; Col. 12, lines 1-19).

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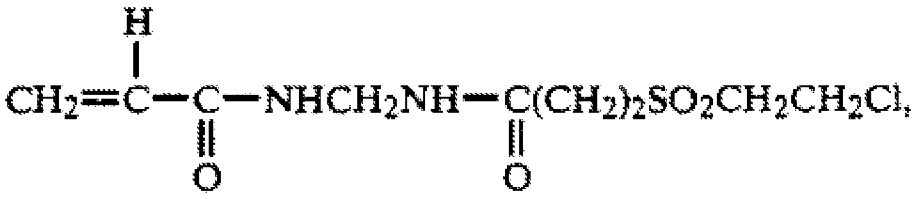

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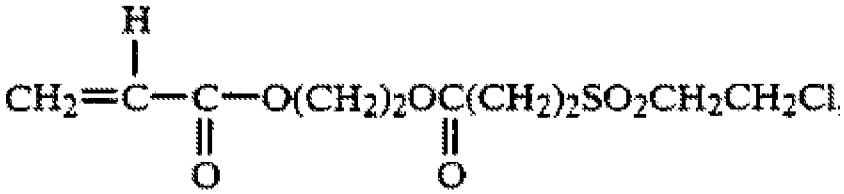

wherein A is O, B is $(CH_2)_2$ and C is a group for reaction $OC(=O)-(CH_2)_2SO_2CH_2CH_2Cl$ (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67).

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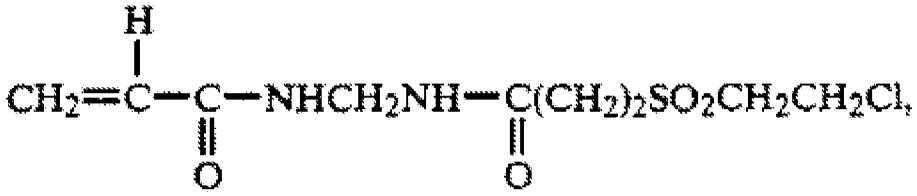

wherein A is NH, B is CH_2 and C is a group for reaction $CH_2NHC(=O)\text{-}(CH_2)_2SO_2CH_2CH_2Cl$

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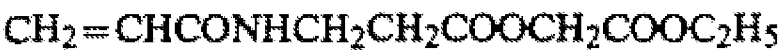

wherein A is NH, B is $(CH_2)_2$ and C is a group for reaction $COOCH_2COOC_2H_5$

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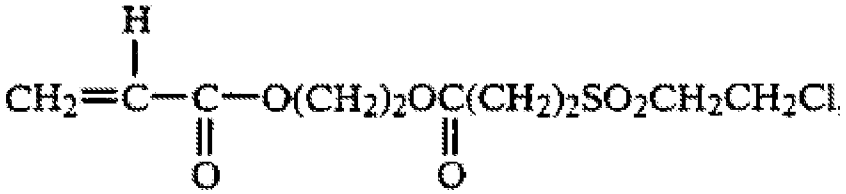

wherein A is O, B is $(CH_2)_2$ and C is a group for reaction $OC(=O)\text{-}(CH_2)_2SO_2CH_2CH_2Cl$.

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Regarding claims 11 and 12, Ponticello et al. teach C is a haloacetamido (bromoacetamido) (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67; Col. 11, lines 10-54; Claim 1).

Regarding claim 13, Ponticello et al. teach an acrylamide derivative with the following formula

wherein R^1 is a hydrogen or methyl, $R^{2'}$ is a haloacetamido, and L is an $-(R_3)_k-(COXR_4)_m-(NHCO)n-$ group where R_3 is arylene, R_4 is alkylene of 1 to 6 carbon atoms, X is –O- or -NH-; and k, m, and n are each 0 or 1 provided that k is 0 when m is 1 and m is 0 when k is 1. Thus the acrylamide formula with the functional group options disclosed by Ponticello et al. read on N-(5-bromoacetamidylpentyl) acrylamide wherein R^1 is a hydrogen, L is of the formula $-(R_3)_0-(COXR_4)_1-(NHCO)_1-$ group where k is 0 , m=n is 1, X is NH, R_4 is an alkylene of 5 carbon atoms which read on $(CH_2)_5$, and $R^{2'}$ is a haloacetamido which reads on bromoacetamido.

Regarding claims 14 and 15, Ponticello et al. teach the mole ratio of acrylamide (first comonomer) /(3-chloroacetamidopropyl)-methacrylamide (second comonomer) is 96.5/3.5 (i.e.

(3-chloroacetamidopropyl)-methacrylamide is present in the amount of 3.5% relative to the total molar quantity of total comonomers) which reads on the limitations, in instant claims 14 and 15, of ≥ 1 % and ≥ 2% relative to the total molar quantity of total comonomers (Refer to the Specification, Col. 13, lines 35-46).

Regarding claim 16, Ponticello teach the method of polymerizing acrylamide N-(3-chloroacetamidopropyl)methacrylamide with no crosslinking agent or with dithiothreitol (polyunsaturated crosslinker) (Refer to the Specification, Col. 11, lines 10-30 and Col. 12, lines 1-7).

Ponticello et al. do not explicitly teach fused silica (Claim 3), non-silica-based support (Claim 5) and Bromoacetamido (Claim 12 and 13).

Regarding claims 3 and 5, Leon et al. teach fused silica (silica based) and non-silica (i.e. plastics, metals, and semiconductors) as supports for microarrays comprised of copolymers (Refer to the Specification [0021, 0022]).

Regarding claims 12 and 13, Patani et al. teach bioisoterism wherein bioisoteres are defined to "include all atoms and molecules which fit the broadest definition for isosteres and have a similar type of biological activity" and are "compounds or groups that possess near-equal molecular shapes and volumes, approximately the same distribution of electrons, which exhibit

similar properties" (Refer to Page 3148, Para(s) 4). For example, Cl is a bioisoster for Br (Refer to Table 3 and Table 16).

All of the claimed elements were known in the prior art and at the time of the invention, one of ordinary skill in the art would be motivated to combine the prior art reference teachings to arrive at the claimed invention. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the Cl group in $R^{2'}$ (chloroacetamido) taught by Ponticello et al. with Br taught by Patani et al.. One would be motivated to substitute Cl with Br to obtain bromoacetamido because Patani et al. clearly suggest that such a substitution would produce a compound with similar properties and one of ordinary skill in the art would have reasonably expected that a haloacetamido comprising Br would not change the properties of a compound significantly. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Ponticello et al. and polymerize a mixture of acrylamide and an acrylamide derivative that contains a group for reaction with a compound of interest on a support consisting of fused silica or a non-silica based material such as plastic as an alternative to a glass support, as suggested by Leon et al. (Refer to the Specification [0021]). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to polymerize a copolymer comprising a group for reaction with a compound of interest on a support glass, fused silica, and plastics. (Please see *KSR International Co. v. Teleflex Inc. (KSR)*, 550 USPQ2d 1385 (2007))

Claims 37-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 2003/0008413 A1; published January 2003) in view of Ponticello et al. (US

5,212,253; May 1993), Rubner et al. (US 2003/0157260 A1; published August 2003), Mir (US 2004/0248144 A1; published December 2004), and Adessi et al. (WO 00/18957; published April 2000).

Regarding claims 37 and 48, Kim et al. teach a method comprising the step of applying polyelectrolyte films and coatings (polyelectrolyte) to a substrate surface (support) comprising attached biomolecules (immobilized biomolecules) for the production of high performance microarrays of biomolecules (molecular array comprising a plurality of molecules) (Refer to the Specification [0045 and 0080]).

Regarding claim 38, Kim et al. teach the molecules of interest are biomolecules (e.g. peptide, amino acid, proteins, nucleic acids) (Refer to the Specification [0001-0003, 0020-0029, 0045, 0052, 0072, 0075, 0079, 0080, and 0100]).

Regarding claim 39, Kim et al. teach microarrays on glass substrates (support; silica-based substrate), and polymethyl methacrylate (hydrogel) (Refer to the Specification [0002, 0003, 0010, 0011, 0056, 0066]).

Regarding claim 45, Kim et al. teach the polyelectrolyte applied is polyacrylic acid (Refer to the Specification ([0016]).

Kim et al. do not explicitly teach molecules attach directly or through a linking moiety to a silica-based support (Claim 40), polyelectrolyte multilayers comprising polyacrylic acid and

polyallylamine (Claims 39, 42, and 46), a hydrogel obtained by a method comprising polymerizing a mixture of a first comonomer and second functionalized comonomer of formula (I) and (II) recited in instant claims 1 and 43 on a solid support that is not covalently surface – modified (Claims 43, and 44), polyacrylamide (Claim 41), polyethylene glycol (Claim 47), single molecule array (Claim 49), and a clustered microarray (Claim 50).

Regarding claims 39, 42, and 46, Rubner et al. teach polyelectrolyte multilayers comprising polyacrylic acid and polyallylamine hydrochloride (polyallylamine) to articles (e.g. cellular arrays or protein arrays), wherein biomolecules attached to the surface of the multilayers and the top layer is polyacrylic acid (surface to which the biomolecules are attached; polyallylamine applied followed by polyacrylic acid) (Refer to the Specification [0040 – 0043, 0051, 0052, 0079, 0092-0093]; Claims 1,2,4,5,7, 10, 11, 13, 14, 38, 39, 41, and 49).

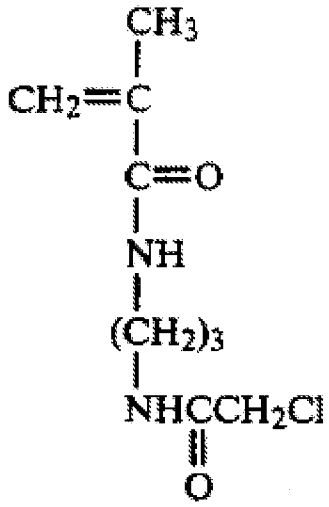
Regarding claim 40, Mir teaches the attachment of a plurality of molecules (e.g. nucleic acids such as DNA and analogues and derivative thereof; biomolecules) to a substrate covalently, non-covalently, via a layer of intermediate molecules to which the plurality of molecules bind, directly, or indirectly (Refer to the Specification [0148, 0156, 0165]).

Regarding claim 41, Mir teaches the molecules immobilized on polyacrylamide substrate (Refer to the Specification [0174 and 0347].

Regarding claim 47, Mir teaches coating the surface of the substrate with polyethylene glycol (Refer to the Specification [0165]).

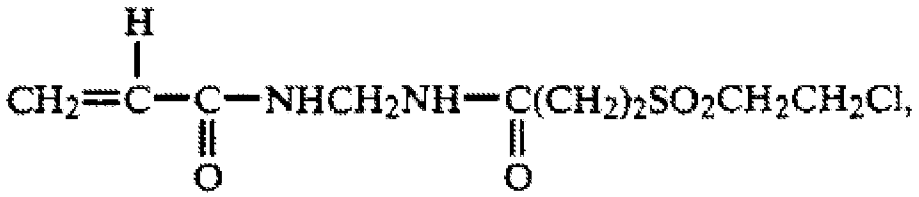
Regarding claims 48 and 49, Mir teaches a method comprising a single molecule array (Refer to the Specification [0043, 0128, 0170, 0171, 0172, 0175, 0182, 0288, 0459, 0480, 0507-0529, 0755-0794]).

Regarding claim 43 and 44, Ponticello et al. teach a method of polymerizing Poly[acrylamide-co-N-(3-chloroacteamidopopyl) methacrylamide] copolymer mixture between two glass plates that is not covalently modified (support; not covalently modified). The mixture comprises acrylamide (first comonomer) and N-(3-chloroacetamidopropyl)-methacrylamide (second comonomer) wherein N-(3-chloroacetamidopropyl)-methacrylamide is a functionalized acrylamide of the Formula II as disclosed in the instant claim1.



wherein A is NH; B is $(CH_2)_3$ and C is a group for reaction NHC(=O)-CH_2-Cl (chloroacetamido) (Refer to the Specification Col. 11, lines 10-68; Col. 12, lines 1-19).

Furthermore, Ponticello et al. teach co-polymerizing acrylamide with an acrylamide derivative such as N-[3-(2-chloroethylsulfonyl)propionamidomethyl]acrylamide (Formula I as disclosed in the instant claim1)

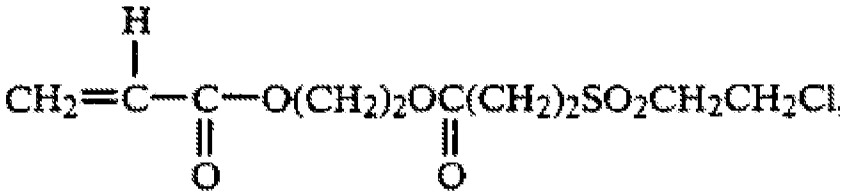


wherein A is NH, B is CH_2 and C is a group for reaction $CH_2NHC(=O)\text{-}(CH_2)_2SO_2CH_2CH_2Cl$

or N-[2-(ethoxycarbonylmethoxycarbonyl)ethyl]acrylamide (Formula I as disclosed in the instant claim1)

wherein A is NH, B is $(CH_2)_2$ and C is a group for reaction $COOCH_2COOC_2H_5$

or with an acrylate derivative such as 2-[3-(2-chloroethylsulfonyl)propionyloxy]ethyl acrylate (Formula I as disclosed in the instant claim1),



wherein A is O, B is $(CH_2)_2$ and C is a group for reaction $OC(=O)-(CH_2)_2SO_2CH_2CH_2Cl$ (Refer to the Specification Col. 4, lines 18-45; Col. 8 lines 42-67).

Regarding claim 50, Adessi et al. teach clustered microarrays (defined in the instant specification as "an array produced by solid-phase amplification of a target or template polynucleotide, wherein amplified copies of the target or template become covalently bound to the support during amplification", Refer to Page 30, lines 21-35 in the instant specification) (Refer to the Specification Page 10, lines 7-36 and Page 11, lines 1-5; Figures 1 and 2 and corresponding captions).

All of the claimed elements were known in the prior art and at the time of the invention, one of ordinary skill in the art would be motivated to combine the prior art reference teachings to arrive at the claimed invention. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a support comprising of polyallylamine and polyacrylic acid multilayers, wherein the top surface of the multilayers is polyacrylic acid. One would be motivated to use a support comprising polyelectrolyte multilayers because polyelectrolyte multilayers are bioinert as taught by Rubner et al. (Refer to the Specification [0007]) wherein nonspecific physiological responses are reduced. Moreover, one of ordinary skill would be motivated to have the top surface of the multilayer comprise polyacrylic acid because biomolecules can readily bind to the polyelectrolyte multilayers via the carboxylic group of polyacrylic acid. In addition, one of ordinary skill in the art would be motivated to apply

polyethylene glycol (PEG) to the surface of a support (e.g. silica based support) because PEG is an inert chemical group that can be used to improve molecular binding of poorly binding molecules to some substrates providing a chemical interface between a solid surface and the molecules for molecular binding. Similarly, one of ordinary skill in the art would be motivated to use a polyacrylamide support because polyacrylamide is chemically inert. Furthermore, one of ordinary skill in the art would be motivated to use a copolymer comprising an acrylamide and a functionalized acrylamide/acrylate or methacrylate/methacrylamide monomer of formula I or II of the instant claims because the copolymers have chemical moieties (e.g. Chloroacetamido group) for immobilization of biomolecules such as DNA and as suggested by Ponticello et al., acrylamide monomers are more stable to hydrolysis and they polymerize more readily with other acrylamide monomers such as functionalized acrylamide/acrylate or methacrylate/methacrylamide (Refer to the Specification, Col. 8, lines 34-41).

Furthermore, one of ordinary skill in the art would be motivated to attach a plurality of molecules in a single molecule array because as taught by Mir, single molecule arrays have many advantages such as (1) can resolve complex samples, (2) can separate correct signals from erroneous, and (3) eliminates need for sample amplification (Refer to the Specification [0480 - 0488]). Similarly, one of ordinary skill in the art would be motivated to attach a plurality of molecules in a clustered microarray because solid phase nucleic acid amplification enable a large number of distinct nucleic acid sequences to be arrayed and amplified simultaneously at a high density as taught by Adessi et al. (Refer to the Specification Page 8, lines 25-33). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to

develop a method to modify molecular arrays (e.g. single molecule or clustered) that have various surfaces such as polyacrylamide or polyelectrolyte multilayers. (Please see *KSR International Co. v. Teleflex Inc. (KSR)*, 550 USPQ2d 1385 (2007))

Future Communications

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIANKO GARYU whose telephone number is (571)270-7367. The examiner can normally be reached on Monday through Thursday - 8:00 a.m. to 5:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel can be reached on (571) 272-0718. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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